

and confluent; a narrow margin at the suture is smooth, the epipleural stria is fine and passes round the apex, and terminates after passing the angle at the suture; the propygidium is punctulate like the thorax; the pygidium impunctate in the female and microscopically strigose, in the male it is narrowly smooth at the base, with a coarse vermicular sculpture at the apex; the prosternum bistriate, striae indistinctly joined at the base, where the margin is a little broad; the mesosternum short and transverse, marginal stria nearly complete, being a little broken in the middle only, transverse stria widely sinuous, suture invisible; the metasternum, lateral stria oblique, punctuation sparse; the anterior femora conspicuously grooved like those figured for *Phelister Simoni*, Lew. (Ann. & Mag. Nat. Hist. 1889, vol. iv. p. 46); the anterior tibiae 5-6-dentate, posterior without spines. The minute strigosity is more apparent on the sternal plates than on the upper surface.

The facies of this species is like a very large *Abraeus*, and it is the only species noticed in this paper with an anterior marginal stria to the mesosternum.

Hab. Japan. I took several specimens at different places bordering the great plain of Fujisan in May 1880. It frequents old beeches.

V.—*Descriptions of two new Genera of Scorpions, with Notes upon some Species of Palamnaeus.* By R. I. POCKOCK, of the Natural-History Museum.

[Plate III. B.]

HAVING been occupied of late in the identification of the oriental species of *Scorpio* and *Palamnaeus*, I soon made the discovery that there has been considerable confusion respecting the Indian and Burmese species of the latter genus.

Their history may be briefly told as follows.

The type of the genus, *P. spinifer* (Hempr. & Ehrb.), was originally described as from India. This species, however, has not been identified since it was established, apparently because it was described and figured as having nineteen or twenty pectinal teeth—this number being considerably larger than any presented by the species described by Dr. Thorell.

In 1877 Dr. Thorell characterized from Singapore a species named *P. Petersii*; this form apparently only differs from

spinifer in the number of the pectinal teeth, and I have little doubt the two are synonymous.

But to complicate the matter still further Dr. Thorell subsequently referred to *P. Petersii* a number of specimens obtained by Sig. Fea and Comotto in Burma, which specimens had been previously identified by Mons. Simon as *P. bengalensis* (C. Koch). But both these identifications are, I think, erroneous; for, in the first place, *bengalensis* of C. Koch is a true *Scorpio*, as is shown by examples in this Museum, and, in the second place, the Burmese specimens above referred to seem to be different from the type of *Petersii* that Thorell described from Singapore.

The first assertion needs no justification; the second is based upon the following facts.

Whilst collecting in various parts of Burma Mr. E. W. Oates obtained literally many hundred examples of a species of *Palamnaeus*, which is undoubtedly the Burmese form that Dr. Thorell identified as *P. Petersii*. But amongst those collected at Rangoon there are three examples which are at once to be recognized from the rest. These are of larger size, with the inner border of the hand beset with spiniform tubercles; the vesicle is clear ferruginous, and the chelæ or palpi of the male have almost the same form as in the female. In the others, on the contrary, the size is smaller, the inner border of the hand is thickly granular and not spicular, the vesicle is generally of about the same tint, though sometimes a little paler than the rest of the tail, and the chelæ of the male are more slender and longer than in the female, the manus being especially narrow. Of this latter kind the British Museum has those quantities of specimens that were generously presented by Mr. Oates, and, in addition, one example obtained by Sig. Comotto at Minhla—an example, by the way, that was kindly given to the Museum by the Marquis G. Doria, and which is one of those above referred to as having been identified as *Petersii* by Dr. Thorell. But of the former kind, in addition to those just mentioned from Rangoon, the Museum has very many examples from India, East Indies, Bengal, Mergui, Perak, Penang, Singapore, and Billiton Island. This species is, I think, *spinifer* (Ehrlb.) and *Petersii* of Thorell.

There is nothing in Ehrenberg's figure and description to refute this view. On the contrary, it is clearly shown that the inner border of the hand is armed with spiniform tubercles and that the vesicle is ferruginous. The specimen, moreover, came from India, whence this Museum also has examples. Furthermore, the Museum, as already stated, has specimens

from Singapore, the place where the *type* of *P. Petersii* was obtained—a coincidence which suggests at once the likelihood of specific identity between the scorpions. And this idea as to their identity is amply borne out by Dr. Thorell's description of *Petersii*; for the vesicle is described as ferruginous, and of the hand it is said "*ipso latere interiore granulis acuminatis fortibus obsito.*" But if we turn to what is said of the Burmese specimens that were referred to *Petersii* we read, "*manus intus sat dense granulosa est, granulis sat parvis et parum acuminatis,*" and again, "*color caudæ niger, vesica interdum paullo clariore.*" Thus the figure of *spinifer* and the description of *Petersii* appear to apply to the larger and more widely distributed East-Indian form. The smaller Burmese species is consequently without a name. I propose therefore to call it *P. Thorellii*.

As regards the number of the pectinal teeth, which seems to have been a stumbling-block in the way of the identification of *P. spinifer*, it may be said that the Museum series shows them to vary from 14 to 18 in *spinifer* and from 14 to 19 in *Thorellii*. So that the existence of 19 in the type of *spinifer* and of 16 in the type of *Petersii* cannot be used as an argument for the separation of the two.

The known synonymy of these will be as follows:—

Palamnæus spinifer (Hempr. & Ehrb.).

Heterometrus spinifer, Hempr. & Ehrb. Symb. Phys. Scorpiones, p. 3, pl. i. fig. 2 (1829).

Palamnæus Petersii, Thorell, Ann. & Mag. Nat. Hist. (ser. 4) vol. xvii. p. 13 (1876); Actes Soc. Ital. Sci. Nat. xix. pp. 214-217 (syn. excl.) (1877).

Palamnæus Thorelli, sp. n.

Palamnæus bengalensis, Simon, Ann. Mus. Genov. xx. pp. 360-362 (1884); not *Buthus bengalensis*, C. Koch, Die Arach. ix. p. 3, fig. 696 (1842).

Palamnæus Petersii, Thorell, Ann. Mus. Genov. (2) vii. pp. 588-590 (1889); not *Petersii*, Thorell, 1876.

The average size of *P. spinifer* is perhaps about 125 millim., although I have measured many varying from 135 to 140. *P. Thorelli*, on the contrary, is much less, seldom being more, and generally less, than 115 millim.

The appended tables of measurements will serve to show how the sexes of the two species may be recognized. From it may be seen, in addition, that the average length of the tail in the female is greater in *P. spinifer* than in *P. Thorelli*.

For in the former the tail is more than three and a half times the length of the cephalothorax, while in the latter it is less. This circumstance strengthens the evidence of identity between *P. spinifer* and *P. Petersii*; for the figure of *P. spinifer* shows that the tail (judging from the sketch of the lateral view of it) is a little over three and a half times the length of the cephalothorax.

Mons. Simon has recorded a species which he considers to be *Petersii* from Bintang. The males of his specimens, however, are not like those that I here call *spinifer*, inasmuch as they are declared to be like *longimanus*, Herbst. This opens the interesting question of possible dimorphism in the males.

Now three male examples have been described without their females being known. These are *longimanus* of Herbst, *longimanus* of C. Koch (which is not the same specimen at least as Herbst's type), and *angustimanus* of Thorell. I give a table to show the dimensions of these specimens, together with those of two examples in the British Museum which I provisionally refer to *angustimanus*. A glance shows that the two examples named *longimanus* have the hand-back very short and the movable dactylus long, the difference between the two being 7·5 and 8 millim. respectively, whereas in the others the difference is ·5, 2, and 2·5 millim. But this great interval is almost entirely bridged over by some of the male specimens of *spinifer*. Thus in no. 5 the difference in length between the dactylus and the hand-back is 3, in no. 1 it is 3·5, in nos. 2 and 6 it is 4, in no. 4 it is 4·5, and in no. 3 it is 6—the amount of variation being considerable.

I am consequently disposed to think that at least *longimanus* of C. Koch may be a form of the male of *spinifer*, and I hold the same opinion with regard to the two males in this collection that I have named *angustimanus*. *P. costimanus* of C. Koch is also, I think, probably synonymous with *spinifer*.

It is worthy of note in connexion with this subject that the slenderness of the hand appears to be correlated with the longitudinal wrinkling of the upper surface. Consequently the presence of strong costæ on the hands of these males that have just been discussed need not point to specific distinction between them and *spinifer*, in which the costæ are less manifest.

Table of Measurements in millimetres of *P. spinifer*.

No.	Sex.	Length of cephalo-thorax.	Length of first two tail-segments.	Length of tail.	Length of humerus.	Length of brachium.	Length of hand-back.	Length of movable dactylus.	Width of hand.	Total length of body.	Locality.
1	♂	19.2	17	72.5	18.7	19	19	22.5	16	134.5	Perak.
2	"	19	17	73	18.2	19	18.2	22	14	137	Singapore.
3	"	19	17	74	17	17	16	22	14.3	135	E. Indies.
4	"	18.5	17	72	17	18	16.5	21	16	129.5	Mergui.
5	"	18	15.5	64.5	16.5	17	17	20	14	118.5	E. Indies.
6	"	16.5	15	62.5	14.5	15	14.5	18.5	12.5	112.5	Rangoon.
7	♀	19	16.5	70	15	16	17	21	14	139	E. Indies.
8	"	18	16	68	15	16	17.5	20	15.5	120	E. Indies.
9	"	17.75	16	69	15	16	16	20	14	128	Rangoon.
10	"			64	14.25	14.5	15.33	19	13.33	124	Singapore (Thorell's type of <i>Petersii</i>).
11	"	17	14	61	14	15	15	18	11.5	119	Billiton Island.
12	"	16	13.3	59	13.3	14	14	18	11	113.5	Singapore.

Measurements in millimetres of certain Male Examples of which the Females are as yet unknown.

* Distended with embryos.

No.	Sex.	Length of cephalo-thorax.	Length of humerus.	Length of bra-chium.	Length of hand-back.	Length of movable dactylus.	Width of hand.	Total length of body.	Loc. ?
19	♂	19	23	23	17	25	12.5	128	<i>P. longimanus</i> of C. Koch.
19	"	19	23	24	22	24	11.5	113.5	<i>P. angustimanus</i> (in Mus. Brit.).
18	♀	18	22.5	23	17.5	25	10	108	<i>P. longimanus</i> of Herbst.
16.75	"	16.75	21	21.25	20	20.5	10	117	<i>P. angustimanus</i> of Thorell.
16	"	16	18.5	19.5	17.5	20	10	112	<i>P. angustimanus</i> (in Mus. Brit.).
	"								India.

No.	Sex.	Length of cephalo-thorax.	Length of first two tail-segments.	Length of tail.	Length of humerus.	Length of bra-chium.	Length of hand-back.	Length of movable dactylus.	Width of hand.	Total length of body.	Locality.
1	♂	16.5	14	57.5	15.5	16	15	17	9	101	Barma.
2	"	13.5	12	50	15	15.5	14	15.5	7.5	86	"
3	♀	18.5	14	62	14.5	15	15	18.5	12.5	115	"
4	"	18	15	61.5	14.5	15	15	18.5	13	125.5*	"
5	"	15.5	13.5	53.5	....	....	....	....	....	105.5	"
6	"	14.5	12	50	....	....	....	....	....	95	"

CHELOCTONUS, gen. nov.
(Pl. III. B. fig. 1.)

Cephalothorax with its median eyes near the middle, the lateral eyes, three in number, on the very edge, as in *Hormurus*.

Sternum pentagonal, a little wider than long, narrower at its posterior angles.

Stigmata elongate.

Tail as in *Opisthacanthus*, rather stouter than in *Hormurus*.

Palp.—Humerus as in *Heterometrus maurus*, very convex above, the anterior border reduced to a minimum; manus intermediate in form between that of, e. g., *Opisthacanthus* and of, e. g., *Scorpio*, but rather resembling that of *Iurus* or *Urodacus* in having the "hand-back" double, *i. e.* divided longitudinally by the keel which is found on the hand-back in scorpions of this group; the lower half of this area is not, however, limited below by a keel, and the keel that defines the upper half is weaker than in *Opisthacanthus*.

Chelicerae as in *Opisthacanthus*, *Hormurus*, and *Palamnaeus*, *i. e.* with the terminal fangs of the movable dactylus subequal in length, the inferior being the longer.

Tail, tarsi, stigmata, and pectines as in *Opisthacanthus*.

This genus is very interesting on account of its annexed qualities. On the whole, however, it certainly belongs to the *Opisthacanthus* group, although in the form of its palpi it approaches *Heterometrus*.

Cheloctonus Jonesii, sp. n.

Colour olivaceo-piceus above, palpi darker; legs, chelicerae, and caudal vesicle ferruginous; pectines and genital operculum testaceous.

Cephalothorax a little wider than long, a little longer than the first two caudal segments, convex from side to side, the sides being considerably sloped, the frontal lobes rounded, the middle of the anterior border with an evenly rounded excision, weakly granular, the median sulcus dividing the ocular tubercle and stopping almost immediately behind it; the tubercle low, situated just in front of the middle of the upper surface, the eyes separated by a space about equalling a diameter; the lateral eyes small, subequal, the two anterior contiguous, the posterior separated by a space equal to its own diameter.

Tergites finely and closely granular, sulcate as in *Opisthacanthus*.

Sternites entirely smooth, very finely and closely punctured, the sulci uniting in front and resembling the imprint of a horseshoe; the last rugose, bearing vestiges of four finely granular, posteriorly converging keels.

Tail about three and a quarter times the length of the cephalothorax, narrowed posteriorly, the segments longer than they are thick, distinctly sulcate above, the sides of the upper surface rounded and very finely granular and not keeled, the lower surface distinctly carinate, the keels being normal in number, finely granular, and marked by setiferous pores; the fifth segment nearly flat above, the posterior third of its lower surface without keels; the *vesicle* large, pyriform, entirely smooth, aculeus short and abruptly curved.

Palpi robust; *humerus* coarsely granular above, mostly smooth behind and below, strongly granular in front; *brachium* rugose and subgranular above and behind, and subcostate behind, smooth in front and below except for the keel which separates the anterior and inferior surfaces: *manus* very stout, rugose, and reticulated and convex above, the pattern passing into tubercles internally and externally; the superior moiety of the hand-back forming a large obtuse angle with the upper surface, beset with small tubercles, defined above by a weak keel which anteriorly breaks up into the general pattern of the upper surface, the inferior moiety entirely smooth and polished, the antero-inferior surface granular; very wide, the length of the back being much less than the greatest width and only about equal to the width at the base of the dactyli; the height equal to about three fourths the length of the hand-back; the movable dactylus considerably longer than the hand-back and a little longer than the width of the hand, rugose, carinate, with a lobe which fits into a shallow excavation on the internal edge of the immovable dactylus, the external edge of this dactylus very short, about equal to half the length of the movable dactylus.

Legs very finely granular externally, the lower edge of the femora of the first three pairs more granular.

Pectines short, furnished with six to seven teeth; the genital operculum cleft, about twice as wide as long.

Measurements in millimetres.—Total length 75; cephalothorax, length 11, width 11.5; length of tail 35, of first segment 4.5, of second 5, of third 5.2, of fourth 6, of fifth 7.5, of vesicle and aculeus 7.3, of aculeus 2; width of first 4, of fifth 2.6; humerus, length 7, width 4, height 4; brachium, length 8, width 4.5, height 5; manus, length behind 8,

width 9·2, height 6; length of movable dactylus 9·5, of immovable (along free border) 5.

A single male specimen from the Murchison Range in the Transvaal, collected and presented to the British Museum by Mr. C. R. Jones, with whose name I have very great pleasure in associating this remarkable new form.

HETEROCHARMUS, gen. nov.
(Pl. III. B. figs. 2, 2a, 2b.)

? *Charmus*, Karsch, Mitth. Munch. Ent. Ver. 1878, pp. 101, 104, 105.

Cephalothorax without keels; the ocular tubercle in the anterior half; the frontal region horizontal, not sloped downwards from the tubercle to the anterior margin; three lateral eyes.

Tergites with a single median keel.

Sternum small, pentagonal, wider than long, about equal in length to the genital operculum.

Pectines normal.

Stigmata elongate.

Chelicerae with movable dactylus bifid at the apex, the two fangs equal in length, with three teeth on the upper edge and two on the under; immovable dactylus with two teeth above (the posterior bifid) and two subequal teeth below.

Chelæ with the external series of teeth formed by the enlargement of the three posterior teeth of the median rows, the internal series formed by single enlarged teeth, separated from the apices of the median rows and constituting with the teeth of the external series short oblique rows.

Tail somewhat powerful; no spine beneath the aculeus.

Legs of third and fourth pairs with tibial spur.

Claws free.

In its broad pentagonal sternum this genus departs widely from what is normal in the Buthidæ, and its inclusion in this family will necessitate the abandonment of the definition "sternum subtriangulum." Nevertheless I think it should be referred to this group, for in the sum of its characters it is unmistakably Buthoid.

In the dentition of the chelicerae, the form of the palpi, with their slender unkeeled hands and long dactyli, the arrangement of the denticles on these dactyli, the spurs on the tibiæ of the posterior legs, the keeling of the trunk, &c., it agrees closely with many genera of this family. It only

differs in fact in the form of the sternum. Of all the genera of Buthidæ it certainly comes nearest to *Butheolus* of Simon (*Orthodactylus*, Karsch); but although the sternum in *Butheolus* is more pentagonal (? always) than in the others, it is not so markedly wide as in *Heterocharmus*. In *Butheolus*, again, the cephalothorax has its frontal portion sloped, while in this new genus it is horizontal. Nevertheless the two are undoubtedly very closely allied.

If, again, *Heterocharmus* be compared with the known genera of other families, the only one with which it presents any affinity is *Charmus* of Karsch, a genus which this author referred to the Iurini. But between these the affinity appears to be very great, so far, indeed, as can be judged from the somewhat meagre description that Karsch has given. In fact no generic differences are to be discovered. But I find it hard to believe that any author familiar with scorpions should have placed a species congeneric with the one now before me in close proximity with such forms as *Iurus*, *Scorpiops*, &c. It is almost incredible that the Buthoid characters above mentioned can have been wholly overlooked. I consequently feel compelled to assume that some differences which do not appear in the description do in reality exist between *Charmus* and *Heterocharmus*.

Heterocharmus cinctipes, sp. n.

Colour.—Trunk above and tail fuscous, the former obscurely variegated with fulvous; vesicle ferruginous; ventral surface pale; palpi testaceous, brachium with a fuscous band, manus infusate; legs fuscous, with testaceous joints.

Cephalothorax convex, about as wide as long, nearly as long as the first two caudal segments, weakly but closely granular throughout, the anterior margin nearly straight, the frontal region lightly depressed in the middle, the shallow depression extending over the ocular tubercle to the hinder margin; the ocular tubercle prominent, the eyes large and separated by a space about equal to a diameter.

Tergites granular, more coarsely but less closely so than is the cephalothorax, the first without the median keel, the last more thickly granular, without distinct keels, but lobate on the upper surface.

Sternites smooth and shining, the last beset posteriorly with coarse sharp granules.

Tail excavated above, the first three segments coarsely and

thickly granular below and at the sides, the granulation obscuring the keels, the inferior median keels, however, marked by stronger and sharper granules, the upper surface much more feebly granular, the keels very feeble on the first but defined by larger granules; the keels absent on the third, which has its margins rounded and the position of the superior and supero-lateral keels marked by a larger granule posteriorly; the fourth segment without keels and almost without granules, but roughened by close-set coarse punctures, finely granular only in the excavation of the upper surface; the fifth segment also without keels, but marked with coarse, close-set, sometimes anastomosing punctures, granular on the posterior third of its lower surface, and finely so in the posterior portion of the superior excavation, the anal border lobate at the sides, granular beneath; the vesicle moderately large, coarsely punctured beneath, the aculeus strong and curved. Tail and vesicle thickly and irregularly hairy beneath.

Palpi slender; *humerus* very weakly granular along the feebly developed keels; *brachium* without keels, very slightly granular in front, the rest smooth; *manus* rounded, narrower than the brachium, without keels and without granules, the length of the "hand-back" much greater than the width of the hand; dactyli long, curved, and slender, the length of the movable dactylus nearly twice as great as the length of the hand.

Legs with weakly granular femora, coxæ quite smooth.

Pectines not projecting to the end of the fourth coxæ, furnished with fourteen similar teeth.

Measurements in millimetres.—Total length 30, length of cephalothorax 2·5, of tail 11·5, of first two segments 2·8, of fourth 2, of fifth 3; width of the first 1·6, of the fifth 1·4, of the vesicle 1; length of humerus 2·3, of brachium 2·5, of hand-back 1·2, of movable dactylus 2·5; width of hand ·8.

A single specimen probably from India or Ceylon, but without special locality. It was found in a bottle in Count Keyserling's collection together with a young example of *Scorpio Swammerdami*—a species which is undoubtedly Indian and Ceylonese.

The only known species with which this can be confounded is *Charmus laneus* of Karsch. But it certainly differs in colour, in having the last abdominal sternite coarsely and not "subtiliter" granular, the tail certainly carinate in part, and the fourth segment punctured and not granular.

EXPLANATION OF PLATE III. B.

- Fig. 1. *Cheloctonus Jonesii*, g. et sp. n. Nat. size.
 Fig. 2. *Heterocharmus cinctipes*, g. et sp. n. $\times 2$.
 Fig. 2 a. The same. Sternum and genital operculum.
 Fig. 2 b. The same. Dentition of dactylus of palp.

VI.—*Description of a new Trap-door Spider from Ceylon.*
 By R. I. POCKOCK, of the British (Natural History) Museum.

[Plate III. A.]

Æcophlæus cinctipes, gen. et sp. n. (Pl. III. A.)

Colour.—Cephalothorax castaneous, variegated with black; ocular area black; mandibles castaneous; sternum, labium, coxæ, and femora clear ochraceous, the patella, tibia, and proximal tarsal segment with a fuscous band round the distal extremity; abdomen fuscous, variegated above and below with testaceous bands and spots.

Cephalothorax longer than wide, its lateral margins convex, anterior margin straight, truncate, its posterior margin lightly concave. The fovea transverse or perhaps very lightly concave backwards. The area of the upper surface behind the fovea sloped at an angle of 45 degrees, the area in front of it very lightly convex longitudinally. No ocular tubercle; the area of the eyes much wider than long and following the convexity of the cephalic portion; the median and the anterior lateral eyes forming a strongly procurved series, the median and posterior lateral forming a recurved series; the median eyes the largest and the highest, a horizontal line drawn from the base of each would touch but not cut the anterior lateral; the anterior laterals separated by a space which is about equal to twice the diameter of a median eye, the distance between the anterior and posterior lateral about equal to a diameter of a median eye, and that between the median eyes is a little less than a diameter of each; the fourth pair of eyes are small, closely in contact with and on the same level as the posterior lateral, and are separated from the median of each side by a space about equal to their own diameter.

Mandibles of moderate size, the anterior surface evenly curved from the base to the fang, smooth above, hairy in front, but not armed with teeth, fringed below with long reddish hairs, and armed internally with a row of denticles.